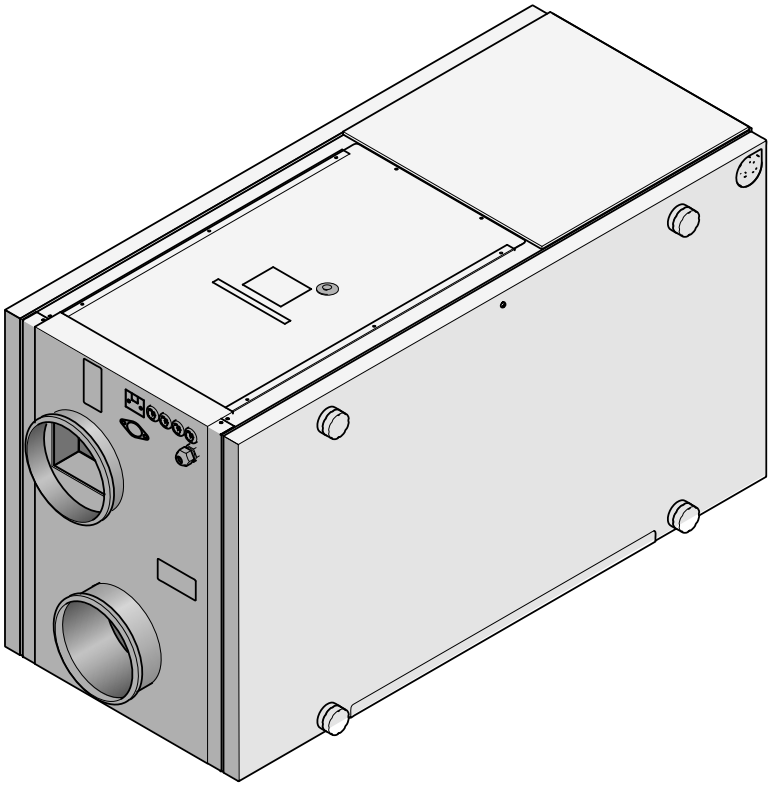
systemair

SAVE VSR 300/500



GB Installation and Service

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1 Declaration of Conformity

Manufacturer

Systemair AB
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hereby confirms that the following product:

Heat recovery ventilation unit: SAVE VSR 300/500

(The declaration applies only to product in the condition it was delivered in and installed in the facility in accordance with the included installation instructions. The insurance does not cover components that are added or actions carried out subsequently on the product)

Comply with all applicable requirements in the following directives:

- Machinery Directive 2006/42/EC
- Low Voltage Directive 2006/95/EC
- EMC Directive 2004/108/EC

The following harmonized standards are applied in applicable parts:

EN ISO 12100-1	Safety of machinery – Basic concepts, general principles for design – Part 1: Basic terminology, methodology
EN ISO 12100-2	Safety of machinery – Basic concepts, general principles for design – Part 2: Technical principles
EN ISO 14121-1:2007	Safety of machinery – Risk assessment – Part 1: Principles
EN 13857	Safety of machinery – Safety distances to prevent hazard zones being reached by upper or lower limbs
EN 60 204-1	Safety of machinery – Electrical equipment of machines – Part 1: General Requirements
EN 60 335-1	Household and similar electrical appliances – Safety Part 1: General requirements
EN 60 335-2-40	Safety of household and similar electrical appliances – Part 2-40: Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers
EN 60529	Degrees of protection provided by enclosures (IP Code)
EN 50 366:2003	Electric domestic products and similar everyday articles Electromagneticfields-Methods for evaluation and measurements
EN 50 106	Safety of household and similar appliances – Particular rules for routine tests referring to appliances under the scope of EN 60 335-1 and EN 60967
EN 60 034-5	Rotating electrical machines – Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code)
EN 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments
EN 61000-6-3	Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standards for residential, commercial and light-industrial environments

The complete technical documentation is available.

Skinnskatteberg, 14-02-2013

Mats Sándor

Technical Director

2 Warnings

The following admonitions will be presented in different sections of the document:

⚠ Danger

- Make sure that the mains supply to the unit is disconnected before performing any maintenance or electrical work!
- All electrical connections and maintenance work must be carried out by an authorized installer and in accordance with local rules and regulations.

⚠ Warning

- The system should operate continuously, and only be stopped for maintenance/service.
- The installation of the unit and complete ventilation system must be performed by an authorized installer and in accordance with local rules and regulations.
- Beware of sharp edges during mounting and maintenance. Use protective gloves.
- All though the Mains supply to the unit has been disconnected there is still risk for injury due to rotating parts that have not come to a complete standstill.
- Make sure that filters are mounted before starting the unit.
- This product must only be operated by a person which has suitable knowledge or education within this field or carried out with the supervision of a suitably qualified person.

⚠ Caution

- Do not connect tumble dryers to the ventilation system.
- Duct connections/duct ends must be covered during storage and installation.

3 About this document

This installation manual concerns air handling unit type SAVE VSR 300/500 manufactured by Systemair AB.
The manual consists of basic information and recommendations concerning the design, installation, start-up and operation, to ensure a proper fail-free operation of the unit.

The key to proper and safe operating of the unit is to read this manual thoroughly, use the unit according to given guidelines and adhere to all safety requirements.

4 Product information

4.1 General

The SAVE VSR 300/500 is a heat recovery ventilation unit, with a built in rotary heat exchanger. The SAVE VSR 300/500 is suitable for houses with up to 240/360 m^2 heated living area.

The SAVE VSR 300/500 supplies filtered outdoor air to residential areas and extract air from bathroom, kitchen and wet rooms.

4.2 Transport and storage

The SAVE VSR 300/500 should be stored and transported in such a way that it is protected against physical damage that can harm panels etc. It should be covered so dust, rain and snow cannot enter and damage the unit and its components.

The appliance is delivered in one piece containing all necessary components, wrapped in plastic on a pallet for easy transportation.

4.3 Technical Data

4.3.1 Dimensions and Weight

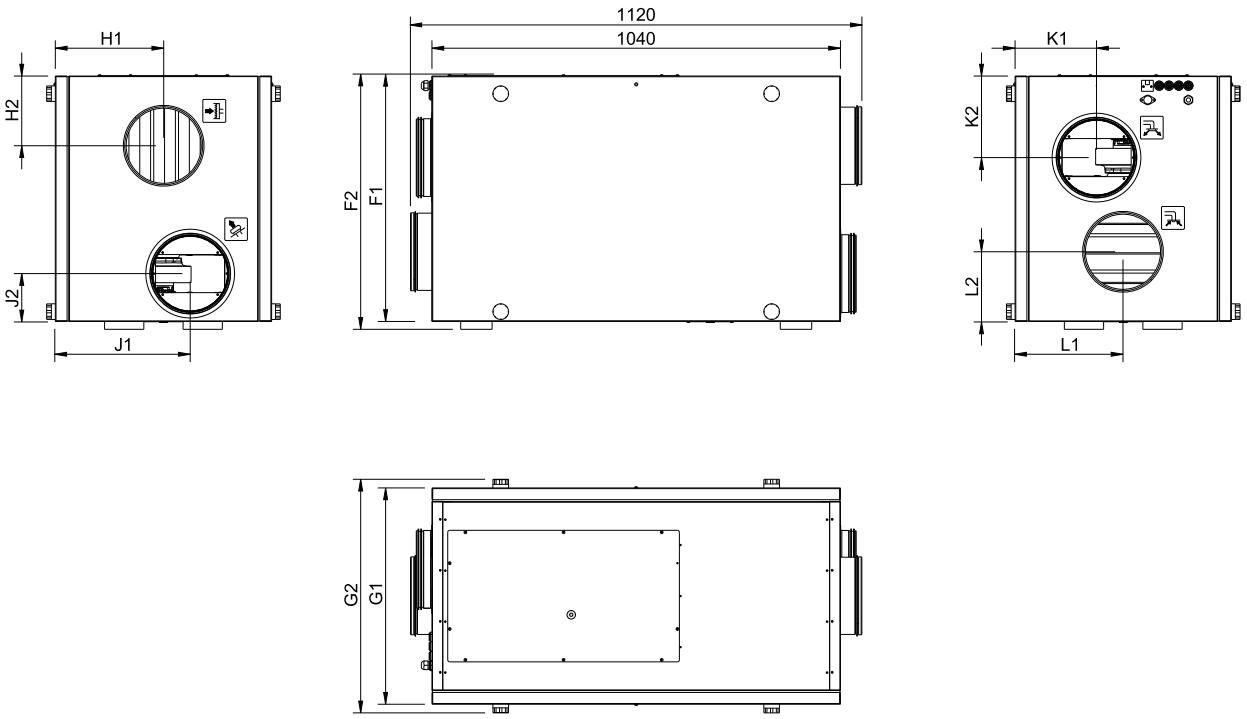


Fig. 1 Dimensions and weight

Measures in mm and weight in kg.

Model	F1	F2	G1	G2	H1	H2	J1	J2	K1	K2	L1	L2	Weight
VSR 300	578	598	461	505	231	188	307	112	160	178	281	136	61
VSR 500	628	648	551	595	276	178	345	123	207	208	276	179	72

4.3.2 Duct connections

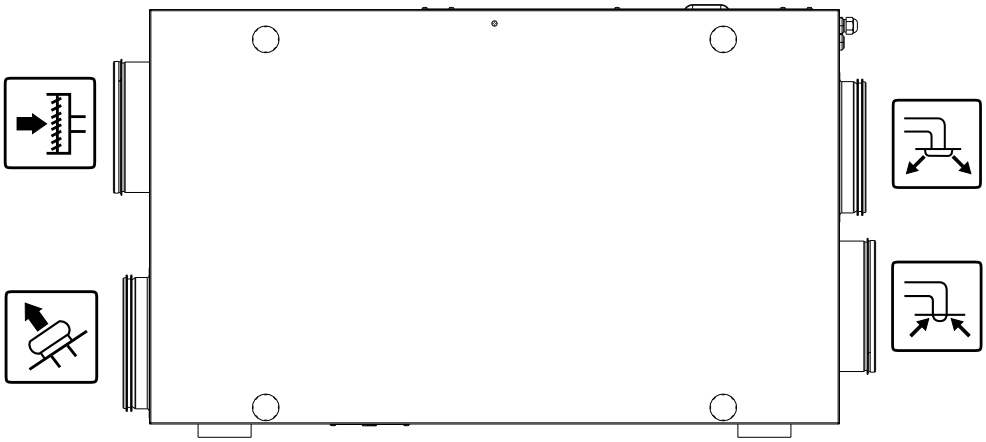


Fig. 2 Duct connections

Symbol	Description	Symbol	Description
	Supply air		Outdoor air
	Exhaust air		Extract air

4.3.3 Power consumption and fuse size

SAVE VSR 300/500 come with 1670 W installed re-heater battery.

Model	VSR300	VSR500
Re-heater	1670 W	
Fans	166 W	338 W
Total power consumption	1836 W	2008 W
Fuse	10 A	13 A

5 Installation

This section describes how to install the unit correctly. To ensure a proper and fail-free operation, it is important that the unit is installed according to these instructions.

5.1 Unpacking

Verify that all ordered equipment are delivered before starting the installation. Any discrepancies from the ordered equipment must be reported to the supplier of Systemair products.

5.2 Where/how to install

The SAVE VSR 300/500 should preferably be installed in a separate room (e.g. storeroom, laundry room or similar.), but can also be installed in the loft space.

When choosing the installation position, consideration must be taken that the unit requires regular maintenance. Flooring boards must be mounted up to and under the unit. Light and mains supply should be installed. Leave free space for removing of inspection doors and for taking out main components inside the unit.

The SAVE VSR 300/500 are supplied with approximately 1 m cable and plug for 230V, single phase earthed connection.

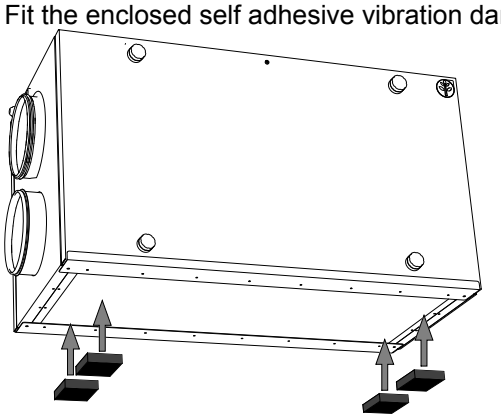
Recommended installation location for the outdoor air intake is the northern or eastern side of the building and with a distance to openings for discharge of stale ventilation air, kitchen ventilator, central vacuum system, waist water drainage and other pollution sources like exhaust from traffic etc. Stale discharge air should ideally be led via a roof unit to the outside and with a good distance to any outdoor air intake, windows etc.

Note:

If the passage to the installation location is narrow, remove the side covers and the side cover support brackets.

5.3 Installation procedure

1. Make sure that the surface is flat and horizontal and that it supports the weight of the unit. Perform the installation in accordance with local rules and regulations.
2. Fit the enclosed self adhesive vibration dampers on the unit.



   Mount according to the enclosed **Vibration Damper Quick Guide**.
3. Lift the unit in place

⚠ **Warning**
Beware of sharp edges during mounting and maintenance. Use protective gloves. Consider the unit weight when mounting!

4. Connect the unit to the duct system. Make sure that all necessary accessories are used to create a functional ventilation solution.

⚠ **Warning**
The installation of the unit and complete ventilation system must be performed by an authorized installer and in accordance with local rules and regulations.

5. Connect the unit electrically to the mains with the enclosed plug and check that it starts up correctly.

5.4 Condensation drainage

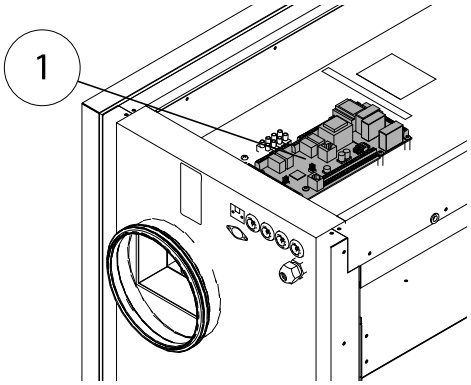
In general no condensation drainage is needed for rotational heat exchangers at dry conditions. However, if a lot of humid air is present in the residence, a condensation drainage might be needed. Drainage connection is available as an accessory and can be ordered seperate.

Note:

The drainage connection is plugged in the bottom of the unit at delivery. To use the drainage: elevate the unit from the floor, remove the rubber seal and and connect the water hose. Connect the water hose to the sewer. The water can not be led straight to the sewer without a water trap.

5.5 Electrical connections

The SAVE VSR 300/500 is wired internally from factory.
The electrical connection box can be found beneath the top cover. The print card can easily be taken out from the unit.



1. Print card

5.5.1 Print card layout

The SAVE VSR 300/500 is equipped with built-in regulation and internal wiring. See below illustration for an overview of the enclosed components.

The figure shows the print card. See wiring diagram for more information.

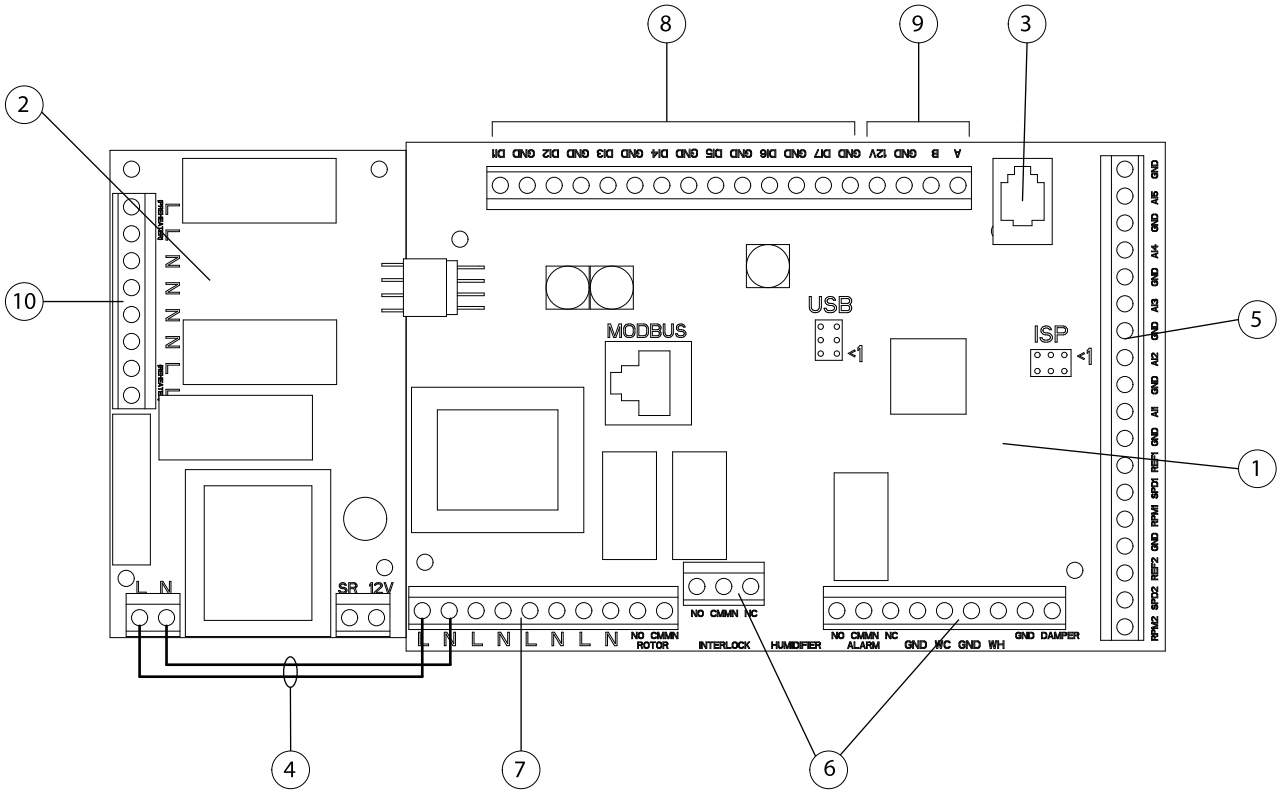


Fig. 3 Print card

Position	Description
1	Main print card
2	Print card for electrical re-heater
3	Connection to external control panel (connected to unit casing)
4	Mains supply connection between main print card and electrical re-heater print card
5	Terminals for AI 1–5 (temp sensors) and motor control
6	Terminals for external connections
7	Terminals for mains supply connections
8	Terminals for digital inputs (DI 1–7)
9	Terminals for internal control panel.
10	Terminals for regulated power supply to electrical re-heater

5.5.2 External connections on the print card

Connection terminals for external equipment can be found on the main print card inside the unit.

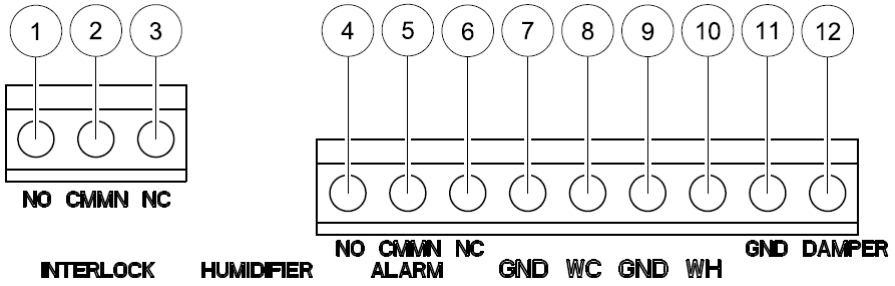


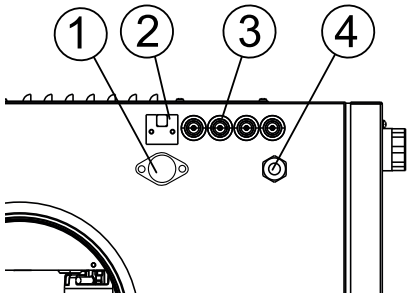
Fig. 4 External connections on the print card

Position	Description	Remark
1	Outdoor/exhaust air damper	Normally open contact, 230 V 1~, max 1 A
2	Outdoor/exhaust air damper	Reference
3	Outdoor/exhaust air damper	Normally closed contact, 230 V 1~, max 1 A
4	Connection to external alarm	Normally open contact, 24 V, max 1 A
5	Connection to external alarm	Reference
6	Connection to external alarm	Normally closed contact, 24 V, max 1 A
7	GND	Reference
8	Water cooler control signal (AO1)	0–10 V DC
9	GND	Reference
10	Water heater control signal (AO2)	0–10 V DC
11	GND	Reference
12	Damper (AO3)	Not used

5.6 External connections on the unit

Two of the connections on the main print card are wired to plugs on the unit casing:

- connection to an external control panel through a modular connector.
  Maximum cable length: 50 m.
  Cable type: Flat 4–conductor CEC Phone cable.
- connection to DI 3 with possibility to configure the fan speeds individually through a potential free on/off switch



1. Connection to DI 3 through an on/off switch
2. Connection to control panel
3. Cable glands
4. 230V cable

6 Commissioning

6.1 Control panel

The control panel is used to make the necessary adjustments.

An external control panel can be connected to the unit. The control panel is delivered with a 12 m cable. Cables in other lengths can be obtained from the supplier.

The illustration below shows the control panel with a short description.

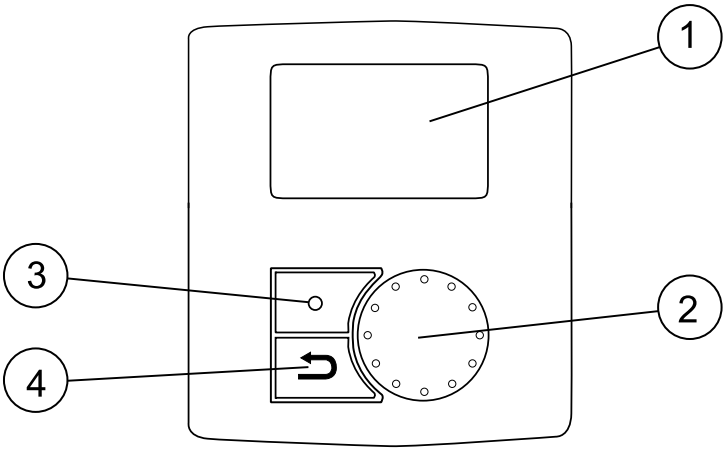
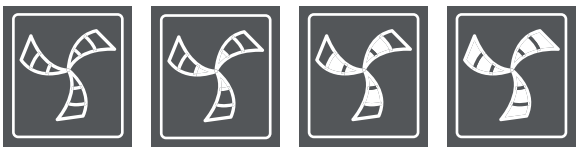


Fig. 5 Control panel

Position	Description	Explanation
1	Display	Shows symbols, menus and settings
2	SELECTION knob	Move through the menu lists or change settings and values by turning the knob left or right
3	CONFIRM button	Confirm menu choices or settings by pressing the button
4	BACK button	Step back in the menu levels and to abort an initiated parameter change and restore the original value by pressing the button

6.1.1 Display symbols

Symbol	Description	Explanation
	Temp	Illustrates the current set temperature. The temperature setpoint is set in 6 steps (from completely empty to filled symbol). Turn the SELECTION knob to choose temperature. Press CONFIRM to save the setting.
	Fan speed	Illustrates the current fan speed. The fan speed can be set manually in 4 steps: Off, Low, Nom and High. Turn the SELECTION knob to choose fan speed. Press CONFIRM to save the setting.  A B C D A. Ventilation off.[1] B. Low ventilation: Can be used when leaving the building for a longer period C. Nominal ventilation: Will give required air change under normal conditions. D. Maximum ventilation: To increase the airflow if necessary.
	Service	Press CONFIRM to access the service menu.
	Alarm	Press CONFIRM to access the alarm list.

1. The fan can be set to OFF by activating MAN fan stop. See service menu description under functions.

Note:

It is not recommended to activate MAN fan stop (set fan to OFF) in standard households.
If MAN fan stop is activated, the unit should be provided with dampers in exhaust and fresh air ducts to avoid cold draught and risk of condensation when the unit has been stopped.

6.2 Start up wizard

The ***Start up Wizard*** is a step-by-step configuration tool that starts automatically when the SAVE VSR 300/500 is started for the first time or when:

- a factory reset is performed
- a new print card is installed (spare part)
  In this case the unit type must be entered (SAVE VSR 300/500)

6.2.1 Procedure

1. Turn the SELECTION knob to choose language and press CONFIRM	Languages Language ENGLISH
2. Choose unit type, this choice is only present if a new print card is installed (spare part)	Type SAVE VSR 300/500
3. Set date and time	**Time/Date** YY/MM/DD Date: 12/09/12 Time: 10:00 Weekday: Sat
4. Select heater: None/Electrical/Water	**Heater** Heater: None/Electrical/Water

5. Set the system curve.

Note:

Before setting the system curve, see chapter 6.3 for details.

This function is implemented in the unit to compensate the flow values for different system pressures.

Supply Fan (SF): Total value range: 1–20. For G3 type filter: 11–20, for F7 type filter: 1–10.
VSR300 default curve: 3
VSR500 default curve: 3

Extract Fan (EF): Value range: 1–10
VSR300 default curve: 3
VSR500 default curve: 3

Note:

The factory installed filters are of filter quality F7 for the supply air and G3 for the extract air filter.
Air filters are accessories and can be obtained from the installer or wholesaler.

The filter type is labelled on the top of the filter.

System curve

EF: 1-10
SF: 1-20

6. Here it is possible to change the Nominal/High/Low air flow on the Extract and Supply air fans.

When settings are done, press CONFIRM.

VSR300:

Airflow l/s	EF	SF
Nom	70	70
Max	88	88
Min	42	42

VSR500:

Airflow l/s	EF	SF
Nom	105	105
Max	146	146
Min	63	63

6.2.2 Perform Factory reset

How to perform a factory reset if necessary:

1. Enter the service menu by selecting the service symbol in the display and press CONFIRM.	
2. Go to password and enter the password, default 1111 Use the SELECTION knob for each digit and confirm with the CONFIRM button after each set digit and choose `NO` for the system not be locked.	**Password** Password XXXX Locked YES/NO
3. Go to Functions and select `Factory Reset`	**Functions** Factory reset
4. Turn the SELECTION knob so `YES` is shown and press CONFIRM.	**Factory reset** Really reset? YES/NO
5. `ACCEPTED` is shown in the display window	**ACCEPTED**
6. The Start up Wizard starts after approximately 10 seconds	

6.3 System curves

A system requires different pressures at different air flows, which can be represented by a system curve. The intersection between the system line and the fan curve, is the unit's working point. It is showing the air flow the system is going to have. Every change in the pressure of the ventilation system, will give rise to a new system curve.

The K-factor is a constant that is the same through out one and the same system curve. If the K-factor and the system pressure is known, the air flow can be calculated. If the real pressure drop in the system is larger or smaller than calculated, the working point and the air flow will be different than expected.

6.3.1 VSR300 Supply air, F7 type filter

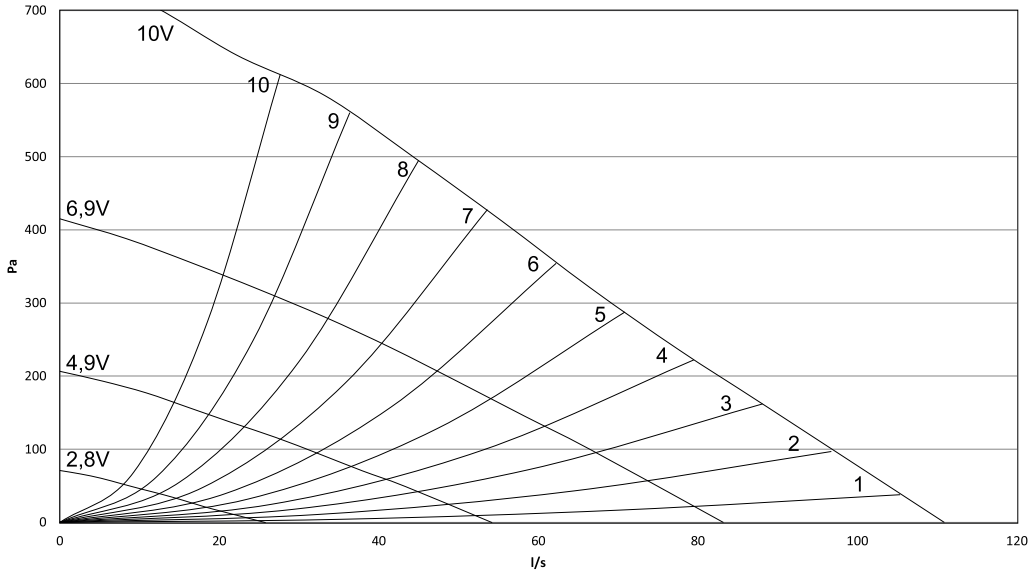


Fig. 6 Supply air system curves, F7 type filter

System curve	K-factor [l/s]
1	17,12
2	9,82
3	6,92
4	5,33
5	4,18
6	3,31
7	2,59
8	2,02
9	1,54
10	1,12

6.3.2 VSR300 Supply air, G3 type filter

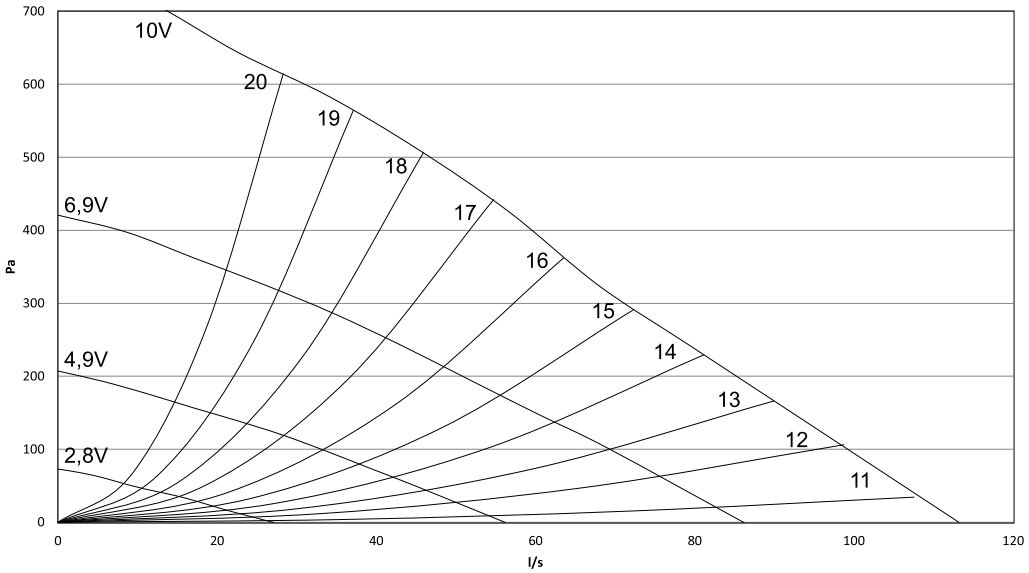


Fig. 7 Supply air system curves, G3 type filter

System curve	K-factor [l/s]
11	18,33
12	9,58
13	6,98
14	5,36
15	4,24
16	3,34
17	2,60
18	2,04
19	1,56
20	1,14

6.3.3 VSR300 Extract air, G3 type filter

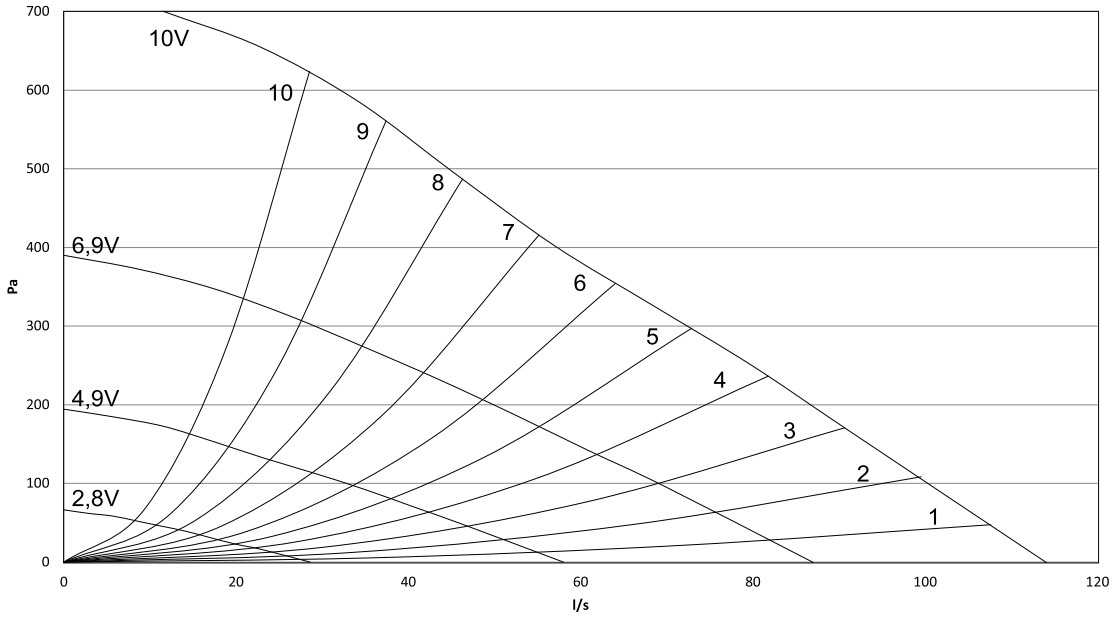


Fig. 8 Extract air system curves, G3 type filter

System curve	K-factor [l/s]
1	15,73
2	9,56
3	6,94
4	5,32
5	4,23
6	3,40
7	2,71
8	2,10
9	1,58
10	1,14

6.3.4 VSR500 Supply air, F7 type filter

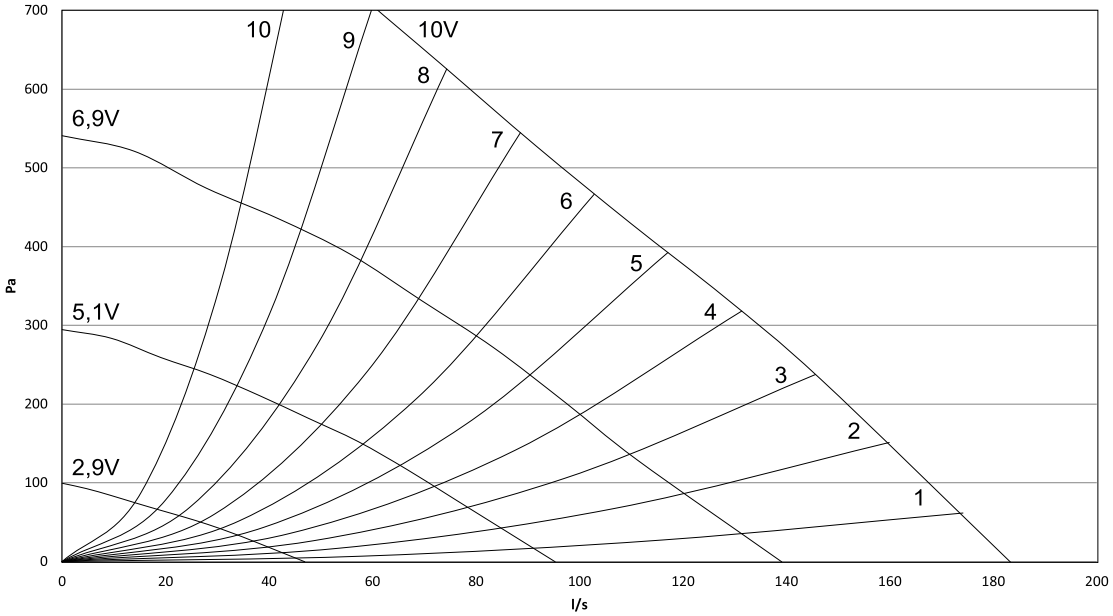


Fig. 9 Supply air system curves, F7 type filter

System curve	K-factor [l/s]
1	22,18
2	13,00
3	9,45
4	7,37
5	5,91
6	4,76
7	3,80
8	2,97
9	2,26
10	1,63

6.3.5 VSR500 Supply air, G3 type filter

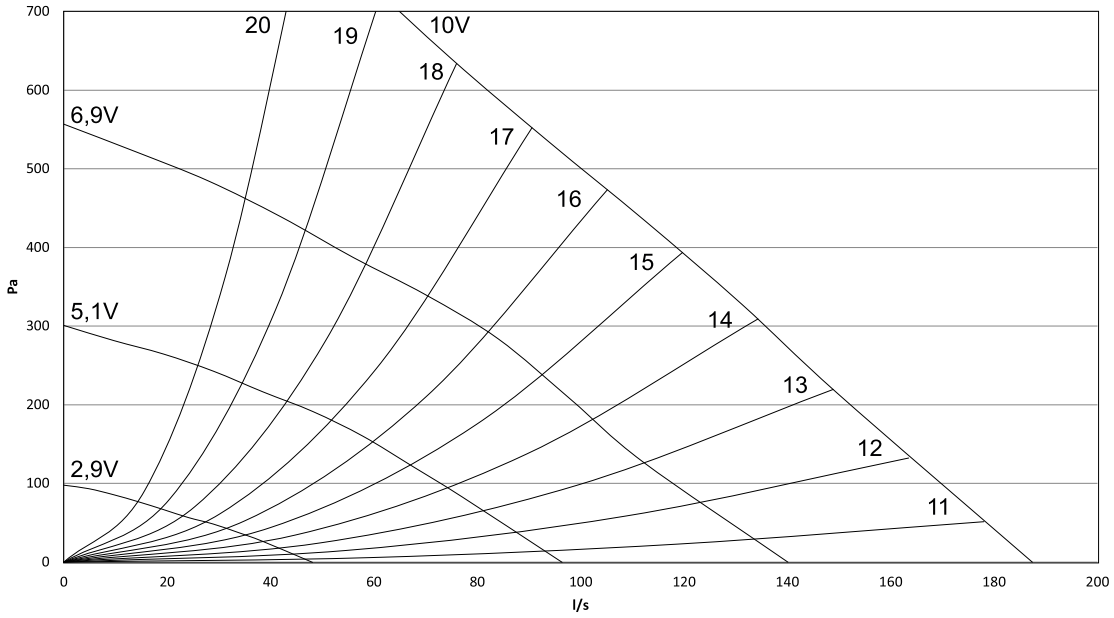


Fig. 10 Supply air system curves, G3 type filter

System curve	K-factor [l/s]
11	24,85
12	14,21
13	10,05
14	7,64
15	6,03
16	4,83
17	3,85
18	3,02
19	2,29
20	1,64

6.3.6 VSR500 Extract air, G3 type filter

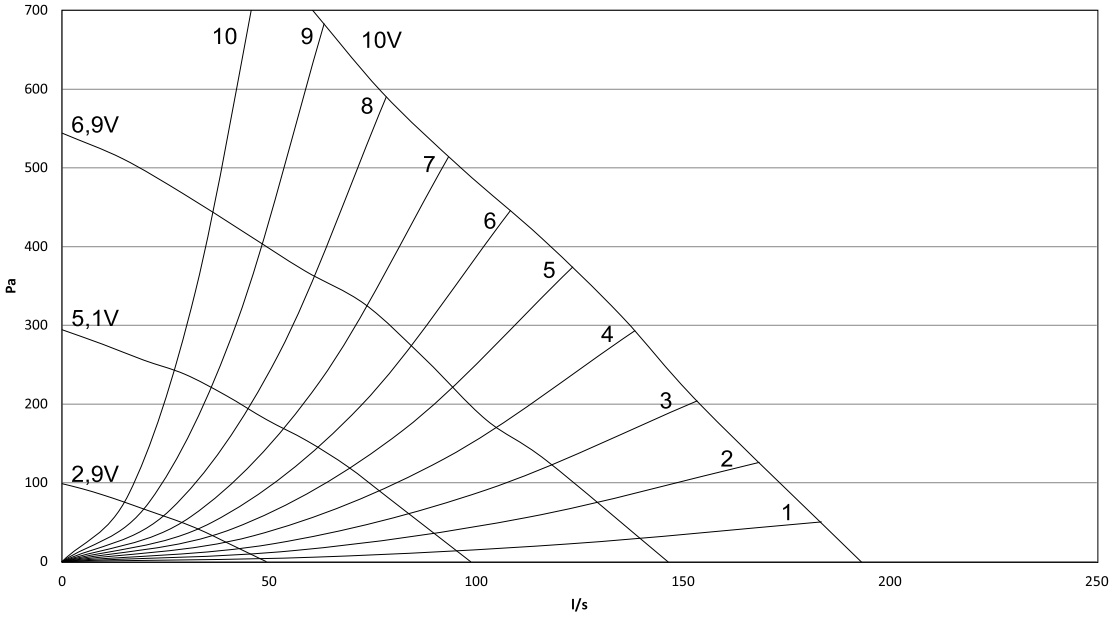


Fig. 11 Extract air system curves, G3 type filter

System curve	K-factor [l/s]
1	25,86
2	15,01
3	10,74
4	8,08
5	6,38
6	5,13
7	4,12
8	3,22
9	2,42
10	1,74

6.4 Fan speed settings

The fan speed may be adjusted in four steps; off, low, nominal and high. These settings control the output signals to the supply- and extract fans. The factory setting on each speed steps are:

VSR300	VSR500
• Off: 0 l/s	• Off: 0 l/s
• Min: 42 l/s	• Min: 63 l/s
• Nom: 70 l/s (at approximately 90 Pa)	• Nom: 105 l/s (at approximately 90 Pa)
• Max: 88 l/s	• Max: 146 l/s

These levels are possible to change in the service level.

Note:

The fan can be set to OFF by activating MAN fan stop. See service menu description under functions.

It is however not recommended to activate MAN fan stop (set fan to OFF) in standard households.
If MAN fan stop is activated, the unit should be provided with dampers in exhaust and fresh air ducts to avoid cold draught and risk of condensation when the unit has been stopped.

See below airflow diagram to get an idea of how the airflow corresponds to each voltage output. This shows a fan performance diagram displaying performance curves for supply air and extract air.

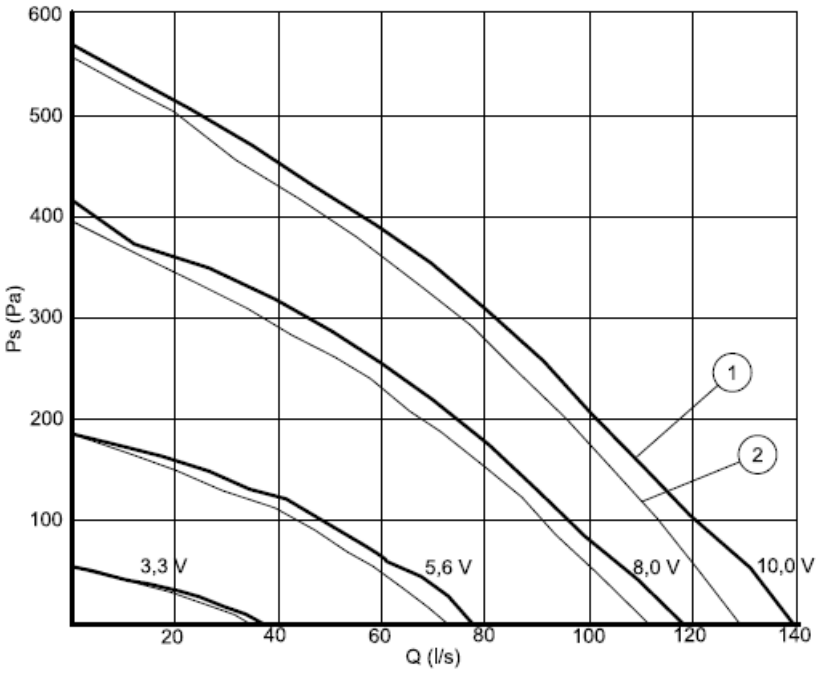


Fig. 12 Fan performance diagram

1. Fan performance curve, supply air
2. Fan performance curve, extract air

6.4.1 Setting the fan speed

1. Go to the service menu by using the SELECTION knob	
2. Enter the service level by typing the password, default 1111. Use the SELECTION knob for each digit and confirm with the CONFIRM button after each set digit and choose "NO" for the system not be locked.	**Password** Password XXXX Locked YES/NO
3. Go to: Functions Choose: Air flow	**Functions** –> Air flow
4. Set the fan speed. All 3 speed categories can be set between system defined Min and Max values.	**VSR300:** **Airflow l/s EF SF** Nom 70 70 Max 88 88 Min 42 42 **VSR500:** **Airflow l/s EF SF** Nom 105 105 Max 146 146 Min 63 63

6.5 Defrost level settings

The unit is equipped with an automatic two-steps defrost function that is activated when there is risk of icing in the area around the heat exchanger. The setting 0-5 (table 2) determines how aggressive the defrosting will be. Default factory setting is mode 0.

Note:

The heat exchanger should withstand low outdoor temperatures, but in those cases where icing can occur please be aware of that the two step defrost setting will generate an under pressure in the building. Using a fire place, be aware that there is a possible risk of smoke being extracted into the living areas due to under pressure if defrosting is activated.

Table 1: Defrost levels

Defrost mode	Relative humidity indoors[1]	Description
0		Defrosting is turned off
1	Minimum <20%	Dry areas, such as warehouse buildings with few people or industrial buildings that don't use water in their production process.
2	Low 30% - 40%	Office buildings
3	Medium 40% - 60%	Apartments or houses with normal humidity[2]
4	High 60% - 80%	Apartments or houses with high humidity
5	Extremely high >80%	Buildings with very high humidity level.

1. *Relative humidity in the extract air at cold outdoor temperatures.*
2. *In newly constructed houses it might be necessary with a higher defrost level during the first winter period.*

6.5.1 Setting the defrost level

1. Go to the service menu by using the SELECTION knob.	
2. Enter the service level by typing the password, default 1111. Use the SELECTION knob for each digit and confirm with the CONFIRM button after each set digit and choose "NO" for the system not be locked.	**Password** Password XXXX Locked YES/NO
3. Go to: Functions Choose: Defrosting	**Functions** Defrosting
4. Set the mode, 0 – 5	**Defrosting** Mode 0-5

6.6 Programming the Week schedule

Set the week schedule according to below procedure:

1. Go to the service menu by using the SELECTION knob.	
2. Enter the service level by typing the password, default 1111. Use the SELECTION knob for each digit and confirm with the CONFIRM button after each set digit and choose "NO" for the system not be locked.	**Password** Password XXXX Locked YES/NO
3. Go to: Week program	**Service** Week program
4. Choose Week program again.	**Week program** Fan speed
4. Set week day and time you want the unit to be in ON level. Two periods per day can be programmed. The rest of the time the unit will be in OFF level.	**Week program** Day: MON Per 1: 07:00 16:00 Per 2: 00:00 00:00
5. Go back to the previous dialogue frame with the BACK button and go down to Fan speed.	**Week program** Fan speed
7. Set which fan speed the fan is supposed to be running in the ON level, choose between Low, Nom or High. Set which fan speed the fan is supposed to be running in the OFF level, choose between OFF, Low, Nom or High. **Note:** If an electrical re-heater battery is installed and active and the unit is shut down from the control panel, for example by choosing OFF. When the unit is in OFF level in the week program, the fans will continue to run for 3 minutes, to prevent the heater from triggering the over heat protection sensor, before they stop.	**Fan speed** On level: low/nom/high Off level: off/low/nom/high
8. Step back with the BACK button until you reach the main menu display	

6.7 Ext/Force run

It is possible to program extended time you want the unit to work under operation conditions other than determined by the week schedule.

1. Go to the service menu by using the SELECTION knob.	
2. Enter the service level by typing the password, default 1111. Use the SELECTION knob for each digit and confirm with the CONFIRM button after each set digit and choose "NO" for the system not be locked.	**Password** Password XXXX Locked YES/NO
3. Go to: Ext/Force Run	**Service** Ext/Force Run
4. Set the time in minutes the unit is to run in extended/forced running mode. Value range: 0–240 minutes. Set the fan speed for this mode. Choose between Low, Nom or High. Default value: Nom.	**Ext/Force Run** Minutes: 0 Fan speed: Nominal

6.8 Extra functions

The unit is equipped with a number of extra on/off functions which can be activated from external on/off switches that can be connected to the digital inputs on the main print card (see wiring diagram).

The following possibilities are available:

- **Digital inputs 1–3**: By connecting on/off switches to these inputs it's possible to choose 3 individual fan speed settings in the control panel depending on a temporary need for the building (for example lowering the extract air fan speed when an open fire place is used). See chapter 8.5.

  DI 3, is prepared and already connected internally for easy access on one gable end of the unit. See chapter 5.6.
- **Digital input 4**: Makes it possible to turn the electrical re-heater battery on or off.

  Activated input means that the electrical re-heater is blocked.
- **Digital input 5**: Activate the Extended/forced running function with a retractive switch. The function overrides current fan speed settings and runs in forced mode according to the settings in Service -> Ext/Force run. Choose between Low, Nom and High for this function.

  The input is calculated based on the signals from an impulse-switch. If a standard switch is used, the countdown of the set time starts when the switch is switched off.
- **Digital input 7**: Home/leave, switching on this input decreases the set-point for supply air-temp with 10°C. This function is used when the building is uninhabited for a longer period. This function is however not working if the unit has been configured to operate with a hot water heater.

  It is recommended to connect either of DI1, DI2 or DI3 in parallel with DI7. If DI7 is activated, set the fans speed to min. Fan speed settings are done when configuring DI1, DI2 or DI3.

See menu options in "Service menu Overview" (chapter 8.5).

7 Before starting the system

When the installation is finished, check that:

- The unit is installed in accordance with the instructions

- The unit is correctly wired
- Outdoor and exhaust air dampers and silencers are installed and that the duct system is correctly connected to the unit
- All ducts are sufficiently insulated and installed according to local rules and regulations
- Outdoor air intake is positioned with sufficient distance to pollution sources (kitchen ventilator exhaust, central vacuum system exhaust or similar)
- All external equipment are connected
- The unit is correctly configured and commissioned
- The week schedule and fan speed settings are correctly programmed.

8 Operation

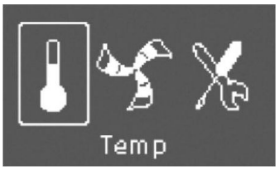
8.1 Setting temperature

The supply air temperature is set manually in 6 steps in the main menu display by choosing the temperature symbol.

If an electrical or water re-heater is installed the temperature setpoints are:
12.0, 14.5, 17.0, 19.5 and 22.0 °C. Default value: 12.0 °C.

If the re-heater is deactivated, the temperature steps are:
15.0, 16.0, 17.0, 18.0 or 19.0 °C. Default value: 15.0 °C.

Each temperature step is illustrated by increasing the filling of the temperature symbol.



An unfilled temperature symbol is the 6th setpoint and will activate manual summer mode. See chapter 8.3

8.2 Manual setting of fan speed

It is possible, at any time, to manually set the fan speed in the main menu display. By choosing the fan symbol and confirming it is possible to increase or decrease the fan speed in the 4 steps: Off, Low, Nom and High.

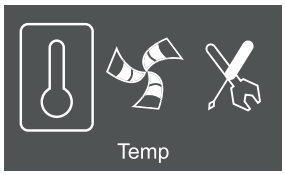
By doing so, you override the programmed week schedule for the unit until the end of the present time period in the week program (chapter 6.6).

Note:

The fan can be set to OFF by activating MAN fan stop. See service menu description under functions.

8.3 Manual and automatic summer mode

Manual summer mode occurs if one temperature step lower than the 12 °C step is selected. The temperature symbol on the main menu is then completely empty.



If the re-heater is active, it will switch off during manual summer mode. Manual summer mode aborts automatically after two minutes if the supply air temperature is less, or equal to, 5 °C.

If a water heater battery is installed and activated, the manual summer mode is aborted if the outdoor air or supply air temperature is less, or equal to, 5 °C.

The unit will automatically alternate between winter operation with heat recovery and summer operation without heat recovery.

8.4 Cool recovery

If the outdoor air is warmer than the extract air and the supply air is above the setpoint, cool recovery occurs. This condition blocks the heat regulation process.

8.5 Service menu overview

Enter the service menu by selecting the service symbol in the display.

Menu Level 1	Menu Level 2	Menu Level 3	Explanation
Service Password	**Password** Password XXXX Locked YES/NO		Enter the service level by typing 1111. Use the SELECTION knob for each digit and confirm with the CONFIRM button after each set digit. NO will unlock the system and allow parameter changes.
Service Change Password	**Change password** Actual XXXX New XXXX Confirm XXXX		**Set** new password if necessary. In case the new password would be forgotten or misplaced it's still possible to enter the service level by writing 8642. This overrides the earlier set password.
Service Filter period	**Filter period** Time to replace: 12month Reset NO/YES		**Shows** selected time interval between filter change. **Set** Reset of the filter period to YES after completed filter change. **Set** time between filter changes.
Service Time/Date	**Time/Date** YY/MM/DD Date: 12/09/12 Time: 10:00 Weekday: Sat		**Shows** current set date and time. **Set** Correct date and time.

Menu Level 1	Menu Level 2	Menu Level 3	Explanation
Service Ext/Force Run	**Ext/Force Run** Minutes: 0 Fan speed: Nominal		Use this dialogue frame to program extended time you want the unit to work under operation conditions other than determined by the week schedule. **Shows** set time for extended/forced running. **Shows** Set fan speed. **Set** the time in minutes the unit is to run in extended/forced running mode. Value range: 0–240 minutes. **Set** the fan speed for this mode. Choose between Low, Nom or High. Default value: Nom.
Service Week program	**Week program** Week program	**Week program** Day: MON Per 1: 07:00 16:00 Per 2: 00:00 00:00	Program how you want the unit to operate according to the week schedule. It's possible to set 2 periods per day. **Set** week day and time interval for the time you want the unit to be in ON mode.
	Week program Fan speed	**Fan speed** On level: low/nom/high Off level: off/low/nom/high	Use this dialogue frame to determine the ON and OFF speed for the fans in the week schedule. **Set** ON level. Choose between Low, Nom or High. Default value: Nom **Set** OFF level. Choose between OFF, Low, Nom or High. Default value: Low.

Menu Level 1	Menu Level 2	Menu Level 3	Explanation
Service Fan speed log	**Fan speed log** Level: 1-5 Reset: NO/YES SF: 140 /140 EF: 140 /140		Use this dialogue frame to see how the fans have operated during the time (h) they have been active. The speeds are shown in 5 different levels: • Level 1: 0% • Level 2: 1 – 29% • Level 3: 30 – 44% • Level 4: 45 – 59% • Level 5: 60 – 100% Choose between the levels to see the time in hours the fans have been active in the different levels. Reset Yes resets the SF and EF time in the left column for all levels. The right column continues to count ahead and can not be reset. **Note:** Factory reset (see Functions ->Factory reset) will not affect this function

Menu Level 1	Menu Level 2	Menu Level 3	Explanation
Service Functions	**Functions** Heater/Cooler	**Heater/Cooler** Heater: None/Electrical/Water Cooler: None/Water	Use this dialogue frame to set up the unit for heating and/or cooling. **Set** Heater to None, Electrical or Water. **Set** Cooler to None or Water.
	Functions Frost protection	**Frost protection** Alarm limit: 7°C	**Shows** current set frost protection alarm limit in °C for the installed water coil. **Set** Alarm limit in °C. Default value: 7°C.
	Functions System curve	**System curve** EF: 1–10 SF: 1–20	This function is to compensate the flow values for different system pressures. See chapter 6.3
	Functions Airflow	**VSR300:** **Airflow l/s EF SF** Nom 70 70 Max 88 88 Min 42 42 **VSR500:** **Airflow l/s EF SF** Nom 105 105 Max 146 146 Min 63 63	Use this dialogue frame to set the fan speed in l/s. The speed can be set individually for each fan **EF**: Extract fan, **SF**: Supply fan **Set** the fan speed for EF and SF for each step (Low, Nom, and High.
	Functions Airflow unit	**Airflow unit** l/s m^3/h	Default value: l/s
	Functions Manual fan stop	**Manual fan stop** Allow manual fan stop Y/N	**Set** if it should be possible to turn off the fans in the unit manually from the control panel. Chose between **Y** and **N**. If **Y** is selected the fans can be turned off by turning the SELECTION knob to empty fan

Menu Level 1	Menu Level 2	Menu Level 3	Explanation
	Functions Analog input	**Analog input** 1: SS 20.0 2: ETS 23.0 3: Unused 4: OT/FPS 20.0 5: OS 10.5	**Shows** analogue inputs from active temperature sensors. **SS**: Supply air temp sensor. **ETS**: Extract air temp sensor. **OT/FPS**: Over heat protection sensor/Frost protection sensor. **OS**: Outdoor air temp sensor.
	Functions Analog output	**Analog output** A01 auto/man/off 0.0V A02 auto/man/off 7.3V A03 auto/man/off 0.0V	**Shows** current analogue outputs in 0–10 V to hot/cold water actuator. **Set** AO1(Analogue output to hot water actuator) to auto, man or off. Default value: off. **Set** AO2 (Analogue output to cold water actuator) to auto, man or off. Default value: off. AO3 Not used.
	Functions Digital input	**Digital input** DI1 ON/OFF DI2 ON/OFF DI3 ON/OFF DI4 ON/OFF DI5 ON/OFF DI6 ON/OFF DI7 ON/OFF	**Shows** current setting of the digital inputs ON or OFF DI1: Fan configuration DI2: Fan configuration DI3: Fan configuration DI4: Heater stopped DI5: Extended/forced running DI6: Rotor sensor DI7: Home/leave

Menu Level 1	Menu Level 2	Menu Level 3	Explanation
	Functions Config DI 1–3	**Config DI 1–3** 1 SF high EF nom 2 SF off EF low 3 SF high EF high	Use this dialogue frame to set how you want the fans to react to 3 different digital inputs when they are switched on or off (the settings in the column to the left are examples). On/off switches need to be connected physically to terminals on the main print card to obtain the different functions. See the wiring diagram for more information. **Set** the supply air fan (SF) and extract air fan (EF) to off, low, nom or High for digital inputs 1–3

Menu Level 1	Menu Level 2	Menu Level 3	Explanation
	Functions DI 4-7	**DI 4-7** 4 Stop heat 5 Ext run 6 Rotor 7 Home/Leave	DI 4–7 are default set from factory and can't be changed by the user. Below follows a short description of each function. DI4: Makes it possible to turn the electrical re-heater battery on or off. Activated input means that the electrical re-heater is blocked. DI5: Activate the Extended/forced running function. The function overrides current set fan speed settings and runs in forced mode according to the settings in Service-> Ext/Force run. Choose between Low, Nom and High for this function.. The input is calculated based on the signals from an impulse-switch. If a standard switch is used, the countdown of the set time starts when the switch is switched off. DI6: Rotor sensor. DI7: Switching on this input decreases the supply air temp set point with 10°C. This function is used when the building is uninhabited for a longer period. It is recommended to connect DI7 and DI1 or DI3 in parallel. If DI7 is activated, set the fans speed to min. Fan speed settings are done when configuring DI1/DI3. **Note:** The "Home/Leave" function is not working if Water heater is activated.

Menu Level 1	Menu Level 2	Menu Level 3	Explanation
	Functions Digital output	**Digital output** 1: SF 67% 2: EF 67% 3: Rot ON/OFF 4: ALARM Y/N 5: Dmp Y/N 6: Reheater Y/N	**Shows** The current settings of digital outputs 1–5 (the settings in the column to the left are examples). 1: SF 67%: Current set speed of the supply air fan (shown as percentage of the maximum speed). 2: EF 67% Current set speed of the extract air fan (shown as percentage of the maximum speed). 3: Shows if the rotor is active or not. 4: Alarm Y/N: Indicates if the sum. alarm is active or not 5: Dmp OFF: Outdoor/exhaust air damper is on or off (230 V signal relay). 6: Reheater Y/N: Indicates if the electrical re-heater is active or not.
	Functions Defrosting	**Defrosting** Mode 0–5	Use this dialogue frame to set how aggressive you want the defrosting function to operate (see chapter 6.5).
	Functions Modbus	**Modbus** Address 1 Baud 9600/19200 Parity None/Even/Odd	Information about Modbus communication and variables can be found in the Modbus user manual for residential units in the online catalogue at **www.systemair.com**.
	Functions Factory reset	**Factory reset** Really reset? YES/NO	Use this dialogue frame to return to factory settings. **Set** YES or NO **Note:** This will erase all your personal settings that have been done for the unit.
Service Language	**Languages** Language ENGLISH		Use this dialogue frame to return to select your local language. **Set** Language by turning the SELECTION knob.

Menu Level 1	Menu Level 2	Menu Level 3	Explanation
Service Versions	**Version VR150** CD EC Appl. 1.08.00 1.22.00 Boot 1.00.01 1.01.00		**Shows** current software versions **Note:** The software versions are just an example and may differ in a specific unit.
Service Alarms	**Alarms** Fan Y EmT/Frost N Damp Y Pb Fail N Temp N Filter Y		**Shows** the alarm list and which alarms that have been triggered (indicated by Y). See alarm list (chapter 9.4.1)

9 Service

9.1 Warnings

⚠ Danger

- Make sure that the mains supply to the unit is disconnected before performing any maintenance or electrical work!
- All electrical connections and maintenance work must be carried out by an authorized installer and in accordance with local rules and regulations.

⚠ Warning

- The system should operate continuously, and only be stopped for maintenance/service
- Although the mains supply to the unit has been disconnected there is still risk for injury due to rotating parts that have not come to a complete standstill
- Beware of sharp edges during maintenance. Use protective gloves
- Make sure that filters are mounted in their place before running the system
- This product must only be operated by a person which has suitable knowledge or education within this field or carried out with the supervision of a suitably qualified person.

9.2 Internal components

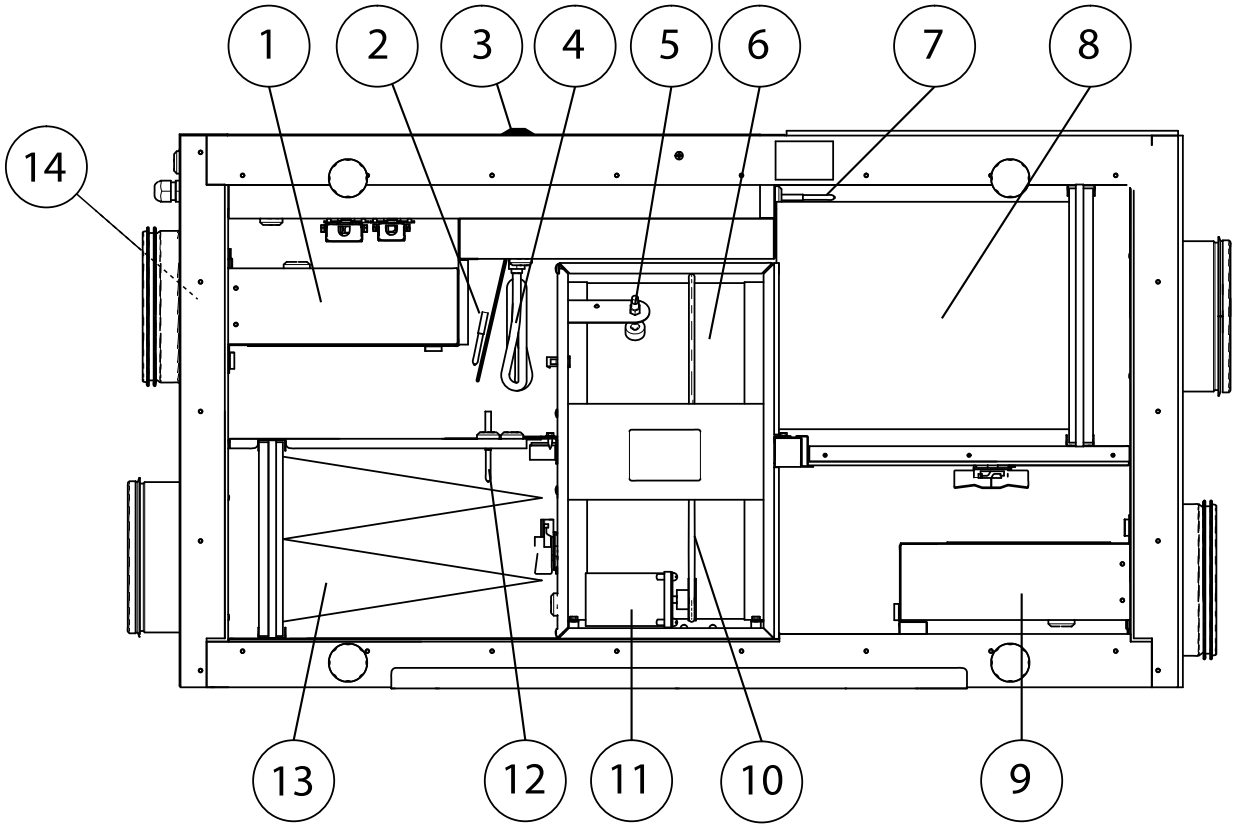


Fig. 13 Internal components

Position	Description
1	Supply air fan
2	Overheat protection sensor
3	Overheat protection reset button
4	Internal electrical re-heater
5	Rotor sensor
6	Rotating heat exchanger
7	Outdoor air sensor
8	Supply air filter
9	Extract air fan
10	Drive belt for rotating heat exchanger
11	Rotor motor
12	Extract air sensor
13	Extract air filter
14	Supply air sensor

9.3 Component descriptions

9.3.1 Fans

The fans have external rotor motors of EC type which can be steplessly controlled individually 20–100%. The motor bearings are life time lubricated and maintenance free. It is possible to remove the fans for cleaning, see “User Manual” for more information.

9.3.2 Filters

The factory installed filters are of filter quality F7 for the supply air and G3 for the extract air filter. The filters need to be replaced when polluted. New sets of filters can be acquired from your installer or wholesaler.

Filter quality G3 can be installed for supply air filtering.
The filter type is labelled on the top of the filter

Note:

If type G3 filters are used instead of F7 , the system curve for Supply Fan (SF) must be changed:

For G3 type filter: 11–20, for F7 type filter: 1–10.

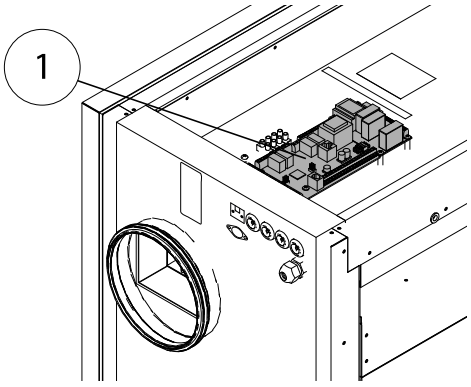
9.3.3 Heat exchanger

SAVE VSR 300/500 is equipped with a highly efficient, rotating heat exchanger. Required supply air temperature is therefore normally maintained without adding additional heat.

The heat exchanger is removable for cleaning and maintenance, see “User Manual” for more information.

9.3.4 Print card

The main print card controls the functions and set temperatures of the unit.



1. Print card

It is possible to connect external accessories to terminals in the print card. See wiring diagram for more information.

9.3.5 Temperature sensors

Four temperature sensors (NTC, 10 kΩ at 25°C) are included in the unit from factory and positioned in the corresponding air chambers.

The sensors are connected to the main print card. See wiring diagram for more information.

9.3.6 Electrical Re-heater battery

The re-heater battery is positioned in the supply air chamber.

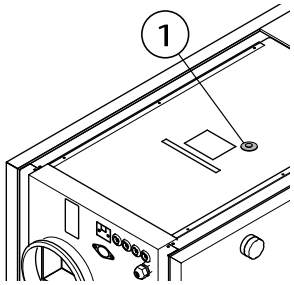
The re-heater is activated by a relay and switches on if the supply air temperature is 2°C lower than the set point and switches off if one or more of the following conditions are met:

1. If the supply air temperature is more than 2°C above the set point
2. If the over heat protection is activated or the sensor is malfunctioning
3. If the emergency thermostat is triggered or broken
4. If the supply air sensor is in error state
5. If the supply air fan is not running
6. If the heater is set to not active in the menu.

9.3.7 Overheat protection reset button

If the supply air temperature is low, it can indicate that the over heat protection is triggered. The overheat protection can be reset by pressing the reset button .

The button is placed on the top cover.



1. Reset button

9.3.8 Water Re-heater battery

A water re-heater battery (optional), which can be acquired as an accessory, can be controlled by the analog output WH (0-10 V DC). The water heater uses AI 4 for frost protection (OT, “Over heat protection”, changes to FPS , Frost protection in the menu).

The frost protection sensor should then be a strap on surface sensor situated on the return water tube. Sensor type: TG-A130

The supply air sensor (SS) at AI 1 must be replaced with a duct sensor which can be acquired as an accessory. Sensor type: TG-K360. See wiring diagram for more information.

Only electrical or water re-heater is allowed, i.e. if a water re-heater is selected, the electrical re-heater is deactivated and vice versa.

Note:

If a water re-heater battery is installed we strongly recommend you to also install an outdoor air damper with a spring return actuator.

9.3.9 Water Cooler

A water cooler (optional) can be acquired as an accessory and be controlled by the unit. If a water cooler is installed the supply air sensor (SS) at AI 1 must be replaced with a duct sensor which can be acquired as an accessory. Sensor type: TG-K360. See wiring diagram for more information.

9.4 Trouble shooting

A warning triangle with text in the display indicates an alarm. Turn menu selector to the warning triangle and press confirm twice to view the alarm.

If problems should occur, please check the items below before calling your service representative.

Malfunction	Action
Fans do not start	1. Check the display for alarms. 2. Check that all fuses and fast couplings are connected (mains supply and fast couplings for supply and extract air fans). 3. Check that the week program is in ON mode. The week program might be in OFF mode with the fan speed set to OFF (chapter 6.6) 4. Check if one of the digital inputs 1–3 (DI 1–3) is active and set to off. This would force one or both fans to stop depending on the setup (chapter 8.5).
Reduced airflow	1. Check the display for alarms. 2. Check setting of fan speed in the control panel (chapter 6.1.1). 3. Check week program (chapter 6.6). 4. Check if one of the digital inputs 1–3 (DI 1–3) is active and set to off. This would force one or both fans to stop depending on the setup (chapter 8.5). 5. Check filters. Change of filters required? 6. Check diffusers/louvres. Cleaning of diffusers/louvres required? 7. Check fans and heat exchange block. Cleaning required? 8. Check if the buildings air intake and roof unit (exhaust) have been clogged. 9. Check visible duct runs for damage and/or build up of dust/pollution. 10.Check diffuser/louvre openings.
The unit cannot be controlled (control functions are stuck)	1. Reset control functions by pulling out the plug for 20-30 seconds. 2. Check the modular contact connection between the control panel and the main print card.

Low supply air temperature	1. Check the display for alarms. 2. Check set supply air temperature in the control panel. 3. Check the analogue inputs in the service menu to verify that the temp sensors are ok (chapter 8.5). Go to `Functions > Analogue input` and verify the temperature readings from the temp sensors. 4. Check if the over heat protection thermostat is still alert. If necessary, reset by pressing the red button placed on the top cover of the unit. 5. Check if digital input 4 (DI 4) is set to off. This would force the electrical re-heater battery to be switched off (chapter 8.5) 6. Check if the extract filter must be changed. 7. At very cold outdoor conditions an electrical or water pre heating battery might be necessary. This can be acquired as an accessory. 8. Check the balance between the supply and extract air
Noise/vibrations	1. Clean fan impellers. 2. Check that the screws holding the fans are tightened. 3. Check that the anti vibration pads are fitted at the bottom of the unit.

9.4.1 Alarm list

Alarm	Explanation	Do the following
Fan	Indicates error on either supply or extract air fan.	The alarm is displayed in the control panel. Contact your installation company or place of purchase.
EMT/Frost	Indicates triggered frost protection (in case of installed water heating battery) or triggered overheat protection (in case of installed electric re-heater battery).	A triggered frost protection alarm results in the following: • Both fans stop. • Outdoor and exhaust air dampers closed. • Water valve opens completely (10 V signal goes out to the actuator). The unit will restart once the water temperature reaches +5°C above the set frost protection temperature. A triggered over heat protection gives an alarm in the control panel. Reset by pushing the red button placed on the top cover of the unit.. If the problem continues contact your installation company or place of purchase.
Rotor	Indicates a rotor malfunction.	The alarm is displayed in the control panel. The rotating heat exchanger has stopped. Check the rotor belt. If the heat exchanger is still rotating, the rotor sensor may be faulty. Contact your installation company or place of purchase

Alarm	Explanation	Do the following
PbFail	Error in connection with relay card for the electrical re-heater (if installed and activated). ET2 may be triggered due to high temperature.	The alarm is displayed in the control panel. The heater will not be activated. For triggered ET2, wait 10–15 min. If the error remains, contact your installation company or place of purchase.
Temp	Malfunction in one or more of the temperature sensors.	The alarm is displayed in the control panel. Contact your installation company or place of purchase.
Filter	Time for filter change.	The alarm is displayed in the control panel. Change filter according to instructions in the user guide.

9.5 Replacing rotor drive belt

If the alarm `Rotor` is raised, see chapter 9.4.1, the rotor drive belt may be damaged or broken.

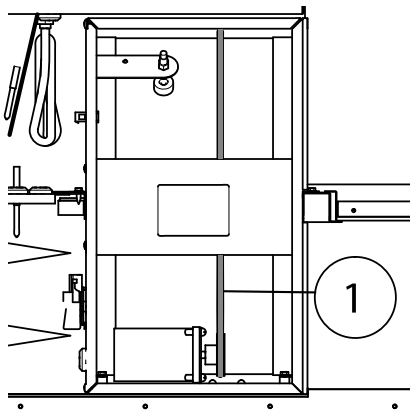


Fig. 14 Rotor drive belt

The replacement drive belt (1) is adjustable and delivered with a nipple attached in one end.

1. Stop the unit by disconnecting the mains.
2. Open and remove the side cover.
3. Remove the broken drive belt.
4. Use tape to attach the drive belt to the rotating heat exchanger, and rotate the exchanger by hand to get hold of the drive belt.
5. Remove the tape and put the ”empty” end on to the nipple. Press the ends firmly towards each other and tighten the nipple.
6. Pull the drive belt on to the belt pulley and rotate the exchanger by hand. Check that the belt pulley rotates.

Note:

If the drive belt slips, the drive belt may be too long and needs to be shortened. Cut the drive belt 5 mm and go to step 5.

7. Replace and lock the side cover and connect the unit to mains.
8. Check that the alarm has ceased on the Control Display.

Note:

If the alarm remains, check the rotor sensor.

9.6 Type label

Before calling your service representative, make a note of the specification and production number from the type label, which can be found on the side of the units, next to the external connections.

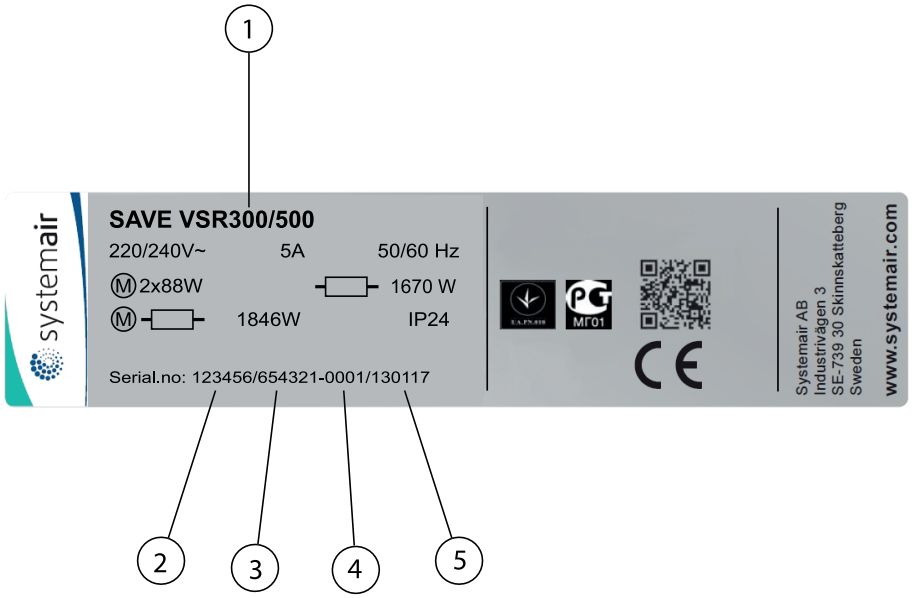


Fig. 15 Type label

Position	Description
1	Product code (product specification)
2	Product item number
3	Production order number
4	Consecutive number
5	Production date

Systemair AB reserves the right to make changes and improvements to the contents of this manual without prior notice.

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